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Miki et al.

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[45] **Date of Patent: Sep. 3, 1996**

[54] **METHOD AND APPARATUS FOR DETECTING A TYPE OF STENCIL AND CONTROLLING THERMAL PERFORATION ENERGY THEREBY**

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[30] **Foreign Application Priority Data**

Oct. 28, 1993 [JP] Japan 5-270205

[51] **Int. Cl.**[6] **B41C 1/055**; B41C 1/14

[52] **U.S. Cl.** **101/128.4**; 101/125; 101/DIG. 46; 347/193; 400/120.13

[58] **Field of Search** ..... 101/116, 125, 101/128.21, 128.4, 129, 127, DIG. 46; 400/120.13; 347/193

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57357	2/1990	Japan	101/128.4
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338559	11/1992	Japan	347/193
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143780	5/1994	Japan	101/128.4

Primary Examiner—Stephen Funk
Attorney, Agent, or Firm—Oliff & Berridge

[57] **ABSTRACT**

A plate making device and method, wherein when a light sensor detects that the stencil plate inserted into the plate making device is provided with the through hole, the controller supplies a current to the thermal head for T1 seconds to control the heat time to be short, so that the perforation energy of the thermal head is reduced. On the other hand, when the light sensor detects that the stencil plate has no through hole, the controller supplies a current to the thermal head for T2 seconds longer than T1 seconds to control the heat time to be long, so that the perforation energy of the thermal head is increased. In this device, even when any type of stencil plate is used, the plate making process providing the best print quality for each stencil plate can be performed.

33 Claims, 12 Drawing Sheets

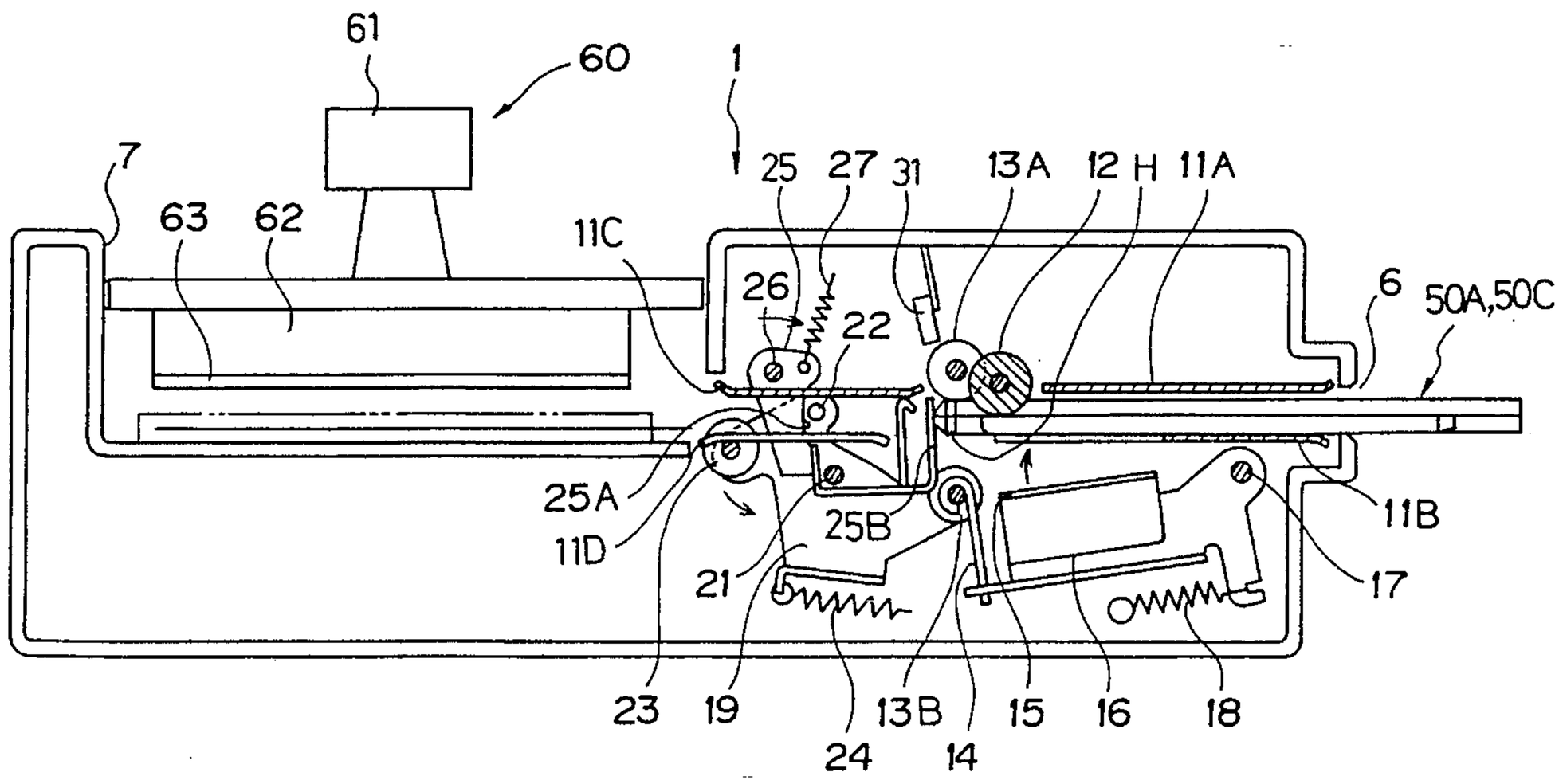


Fig.1A

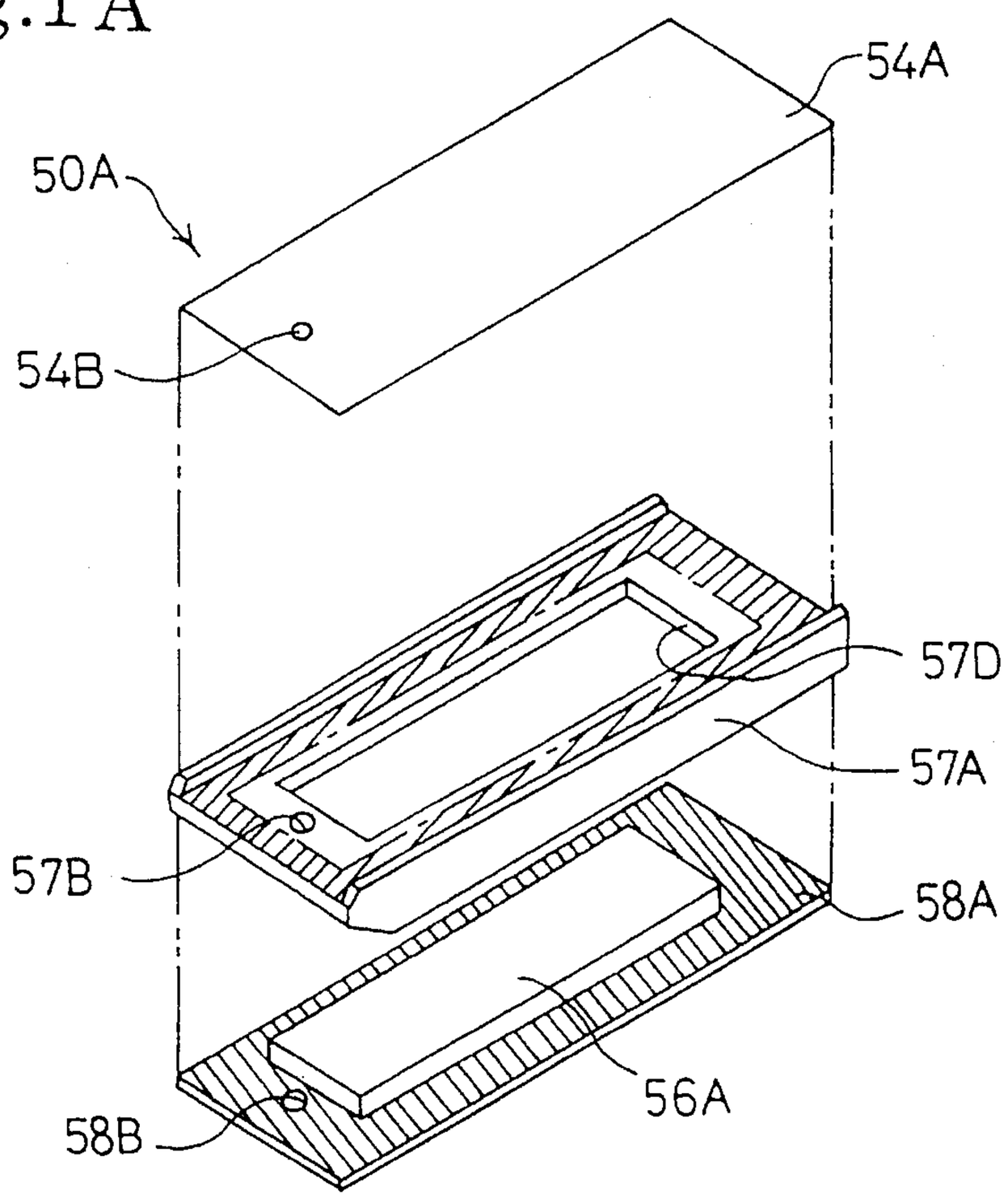


Fig.1B

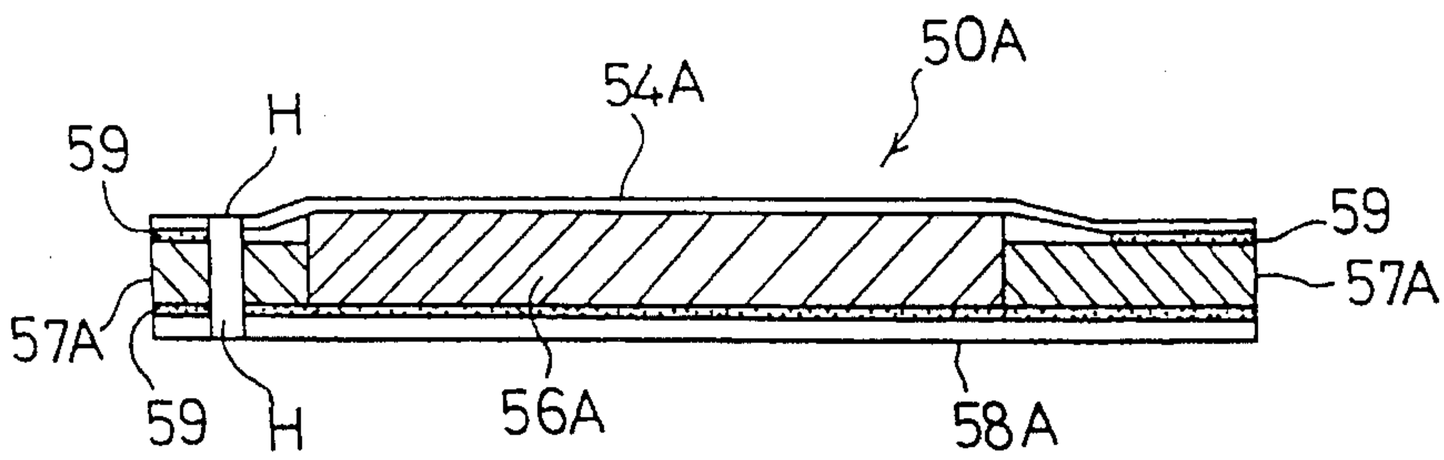
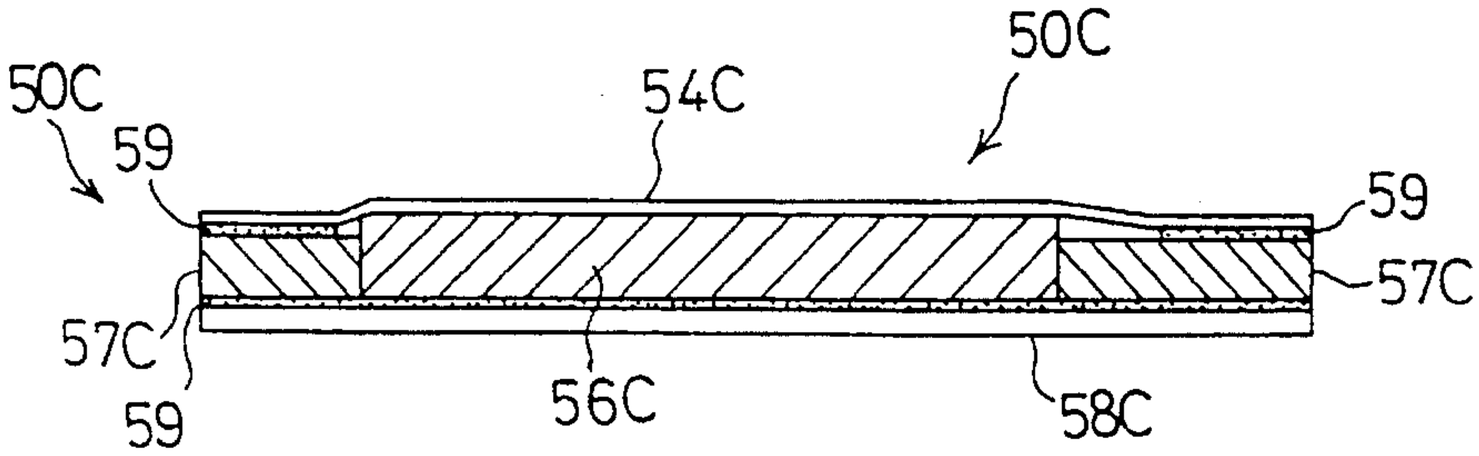


Fig.1C



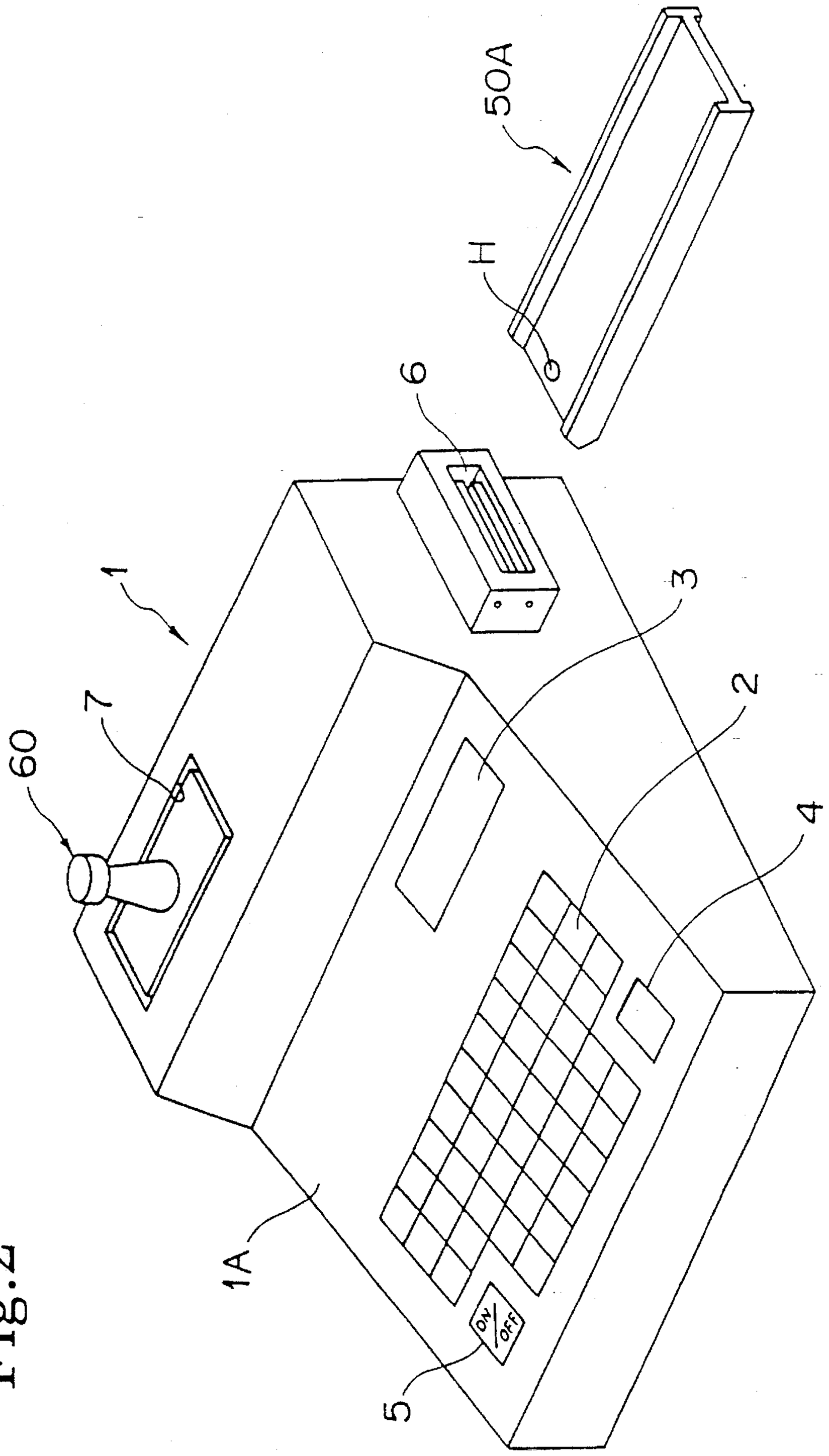


Fig.2

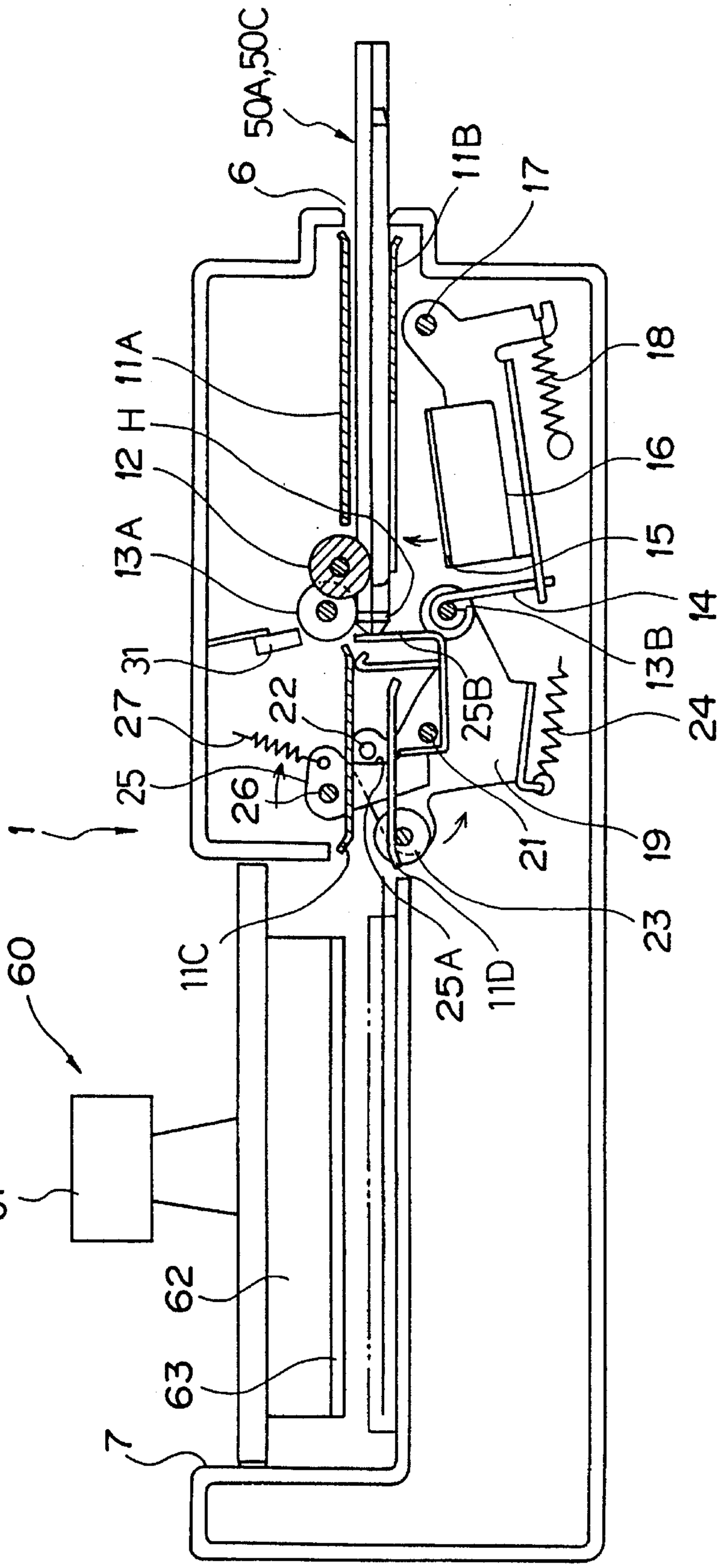

50A,50C
6
11B
17
18
11A
H
12
16
13A
15
14
31
13B
27
22
24
25B
25
26
1
21
19
23
11C
25A
11D
60
61
62
63
7

Fig.3

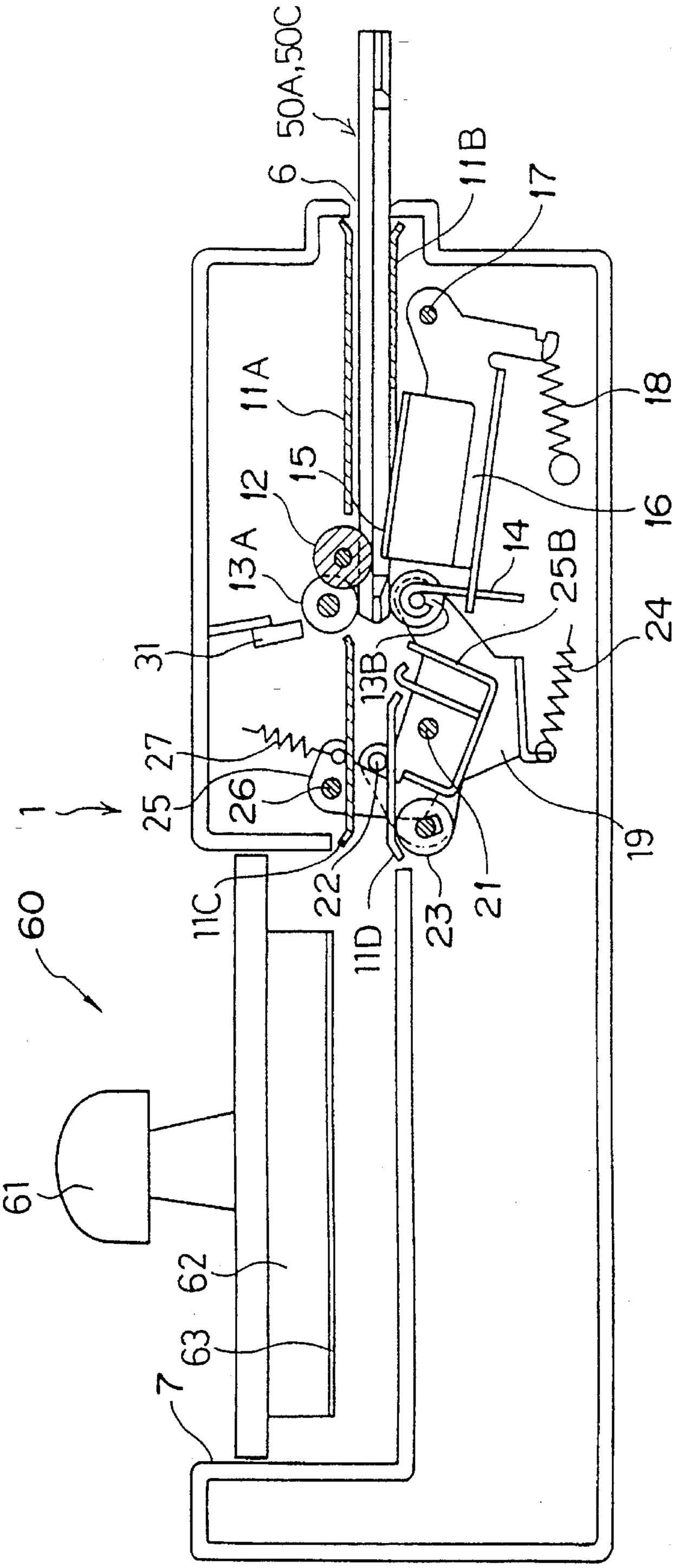

50A,50C
6
11B
17
18
11A
15
12
16
13A
14
25B
24
31
13B
27
25
26
1
19
11C
22
11D
23
21
60
61
62
63
7

Fig.4

Fig.5

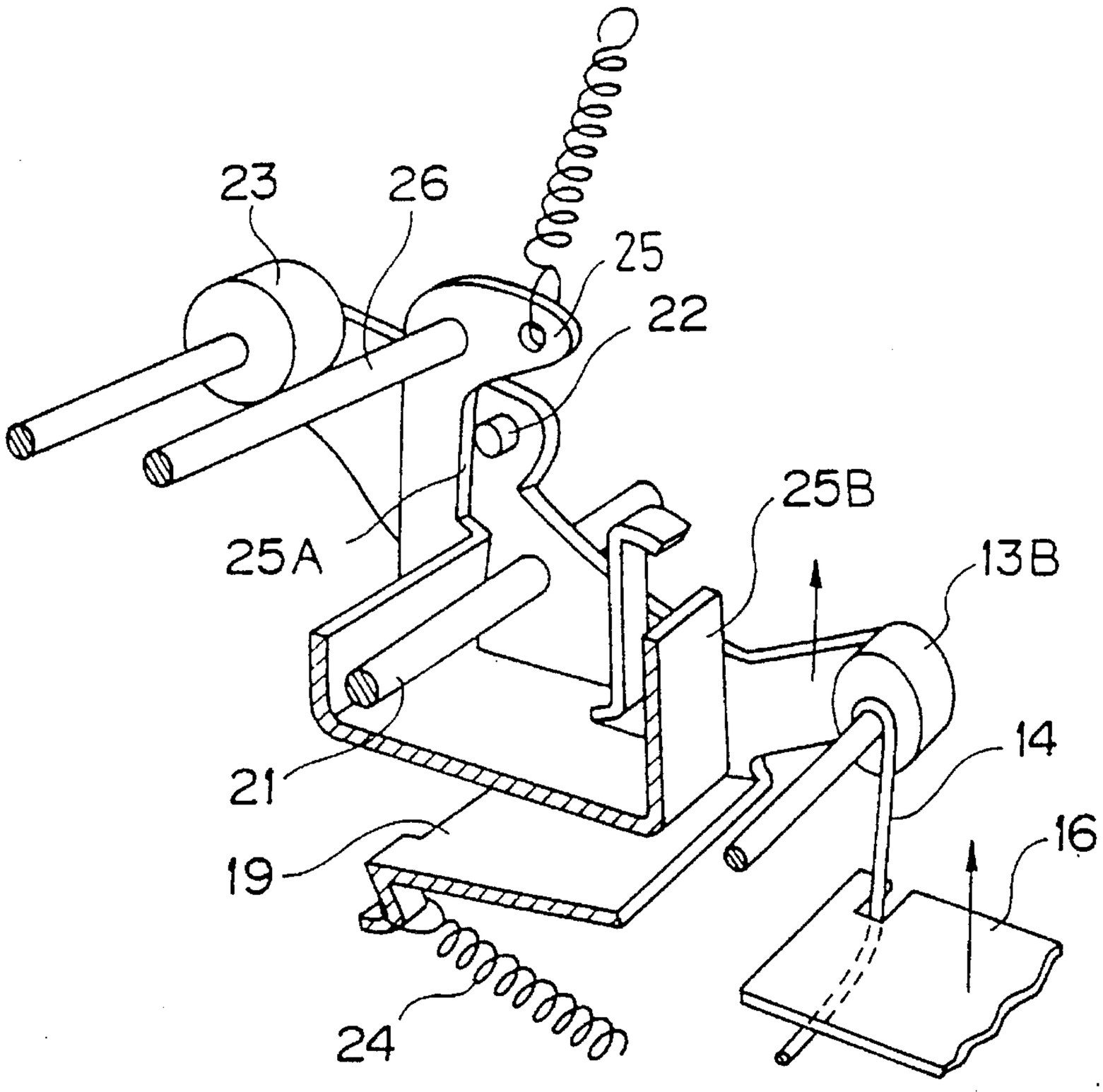
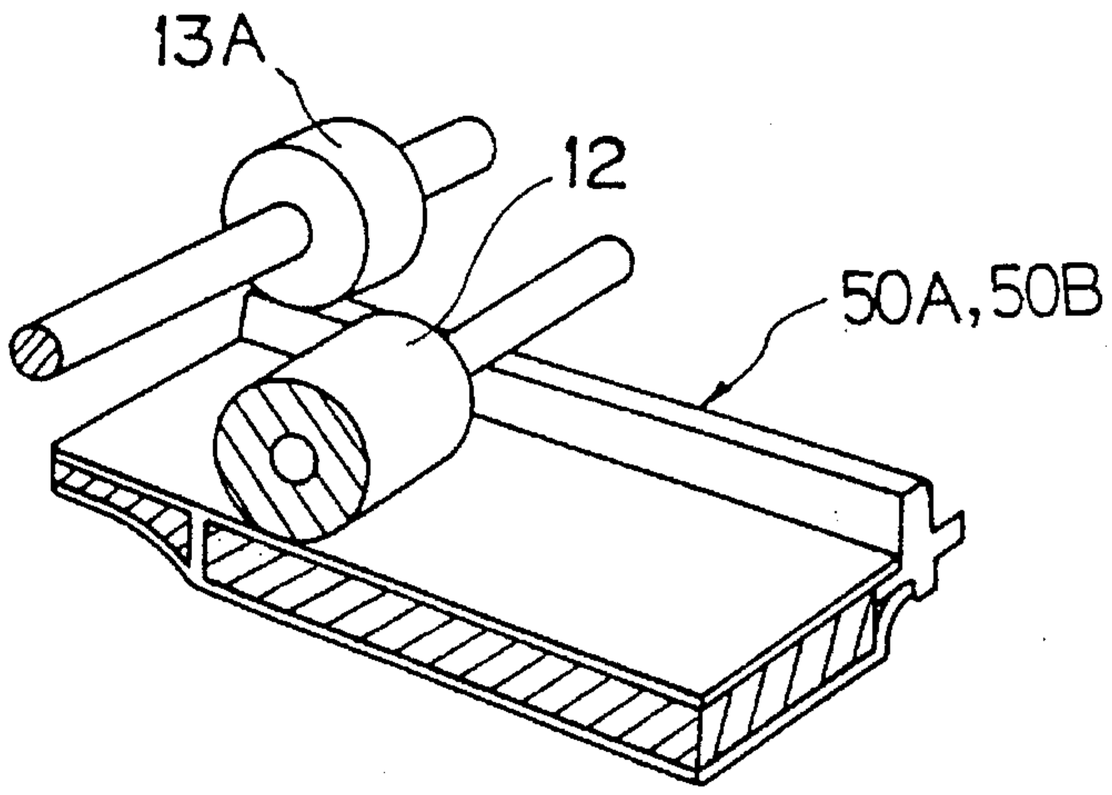


Fig.6



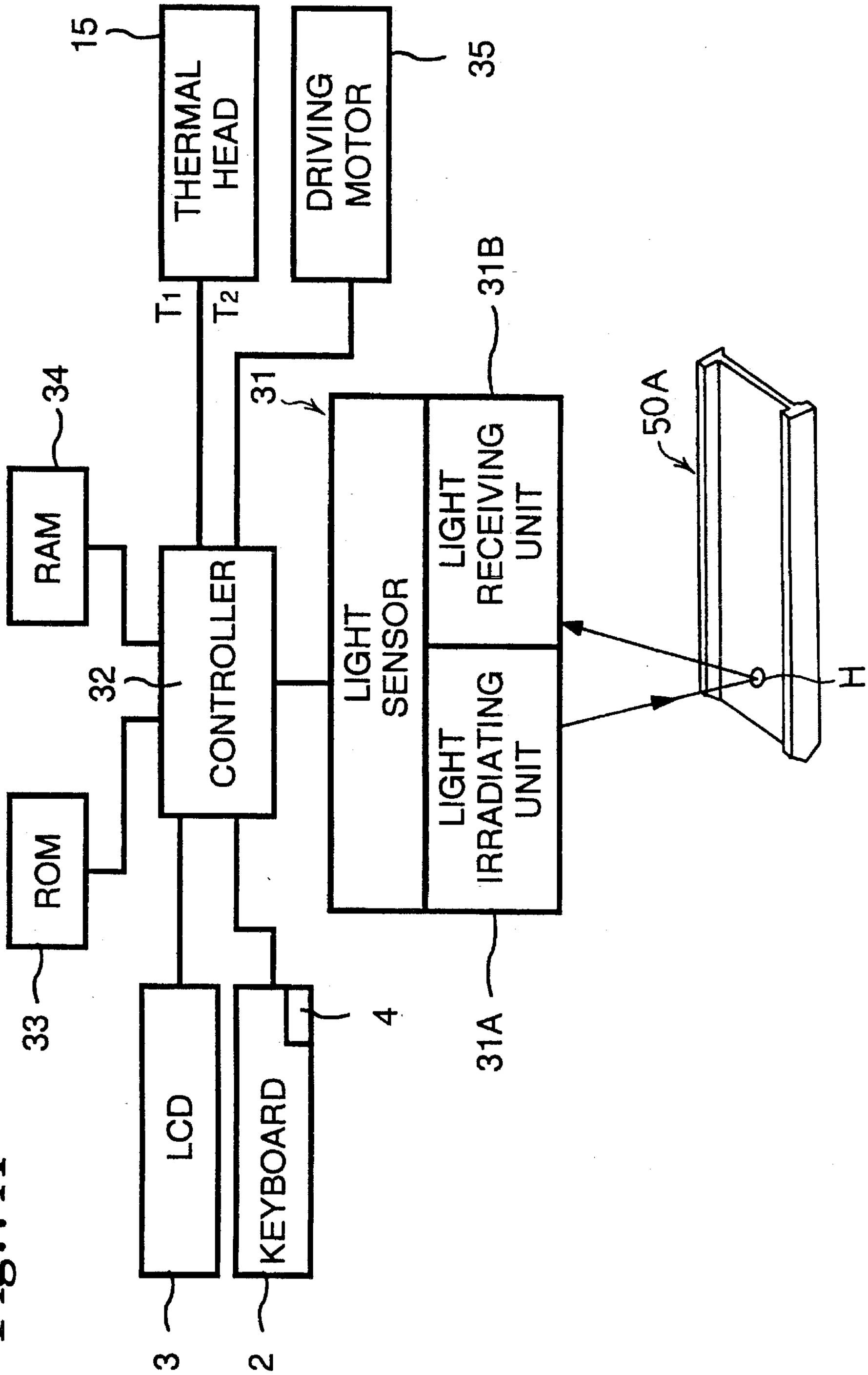

15
THERMAL HEAD
DRIVING MOTOR
35
T1
T2
31B
34
RAM
31
LIGHT SENSOR
LIGHT RECEIVING UNIT
50A
32
CONTROLLER
H
ROM
LIGHT IRRADIATING UNIT
33
4
31A
LCD
KEYBOARD
3
2

Fig.7A

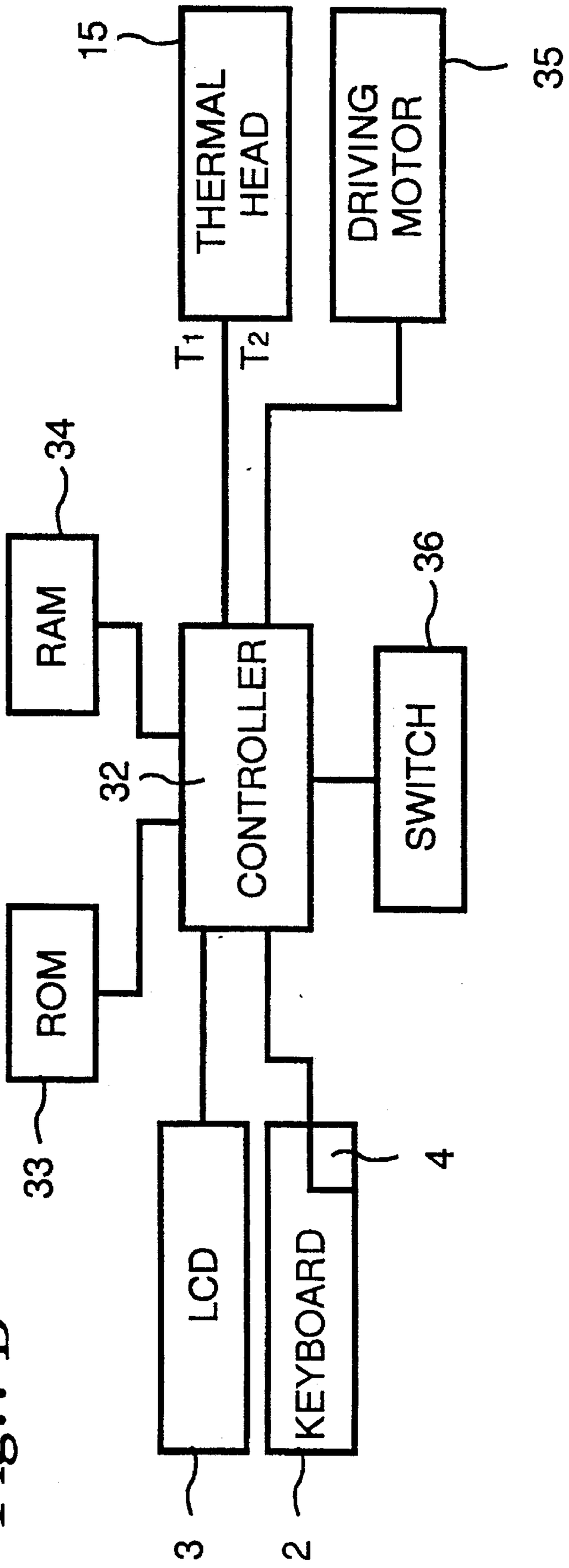

15
THERMAL HEAD
DRIVING MOTOR
35
T1
T2
34
RAM
36
32
CONTROLLER
SWITCH
ROM
33
4
LCD
KEYBOARD
3
2

Fig. 7 B

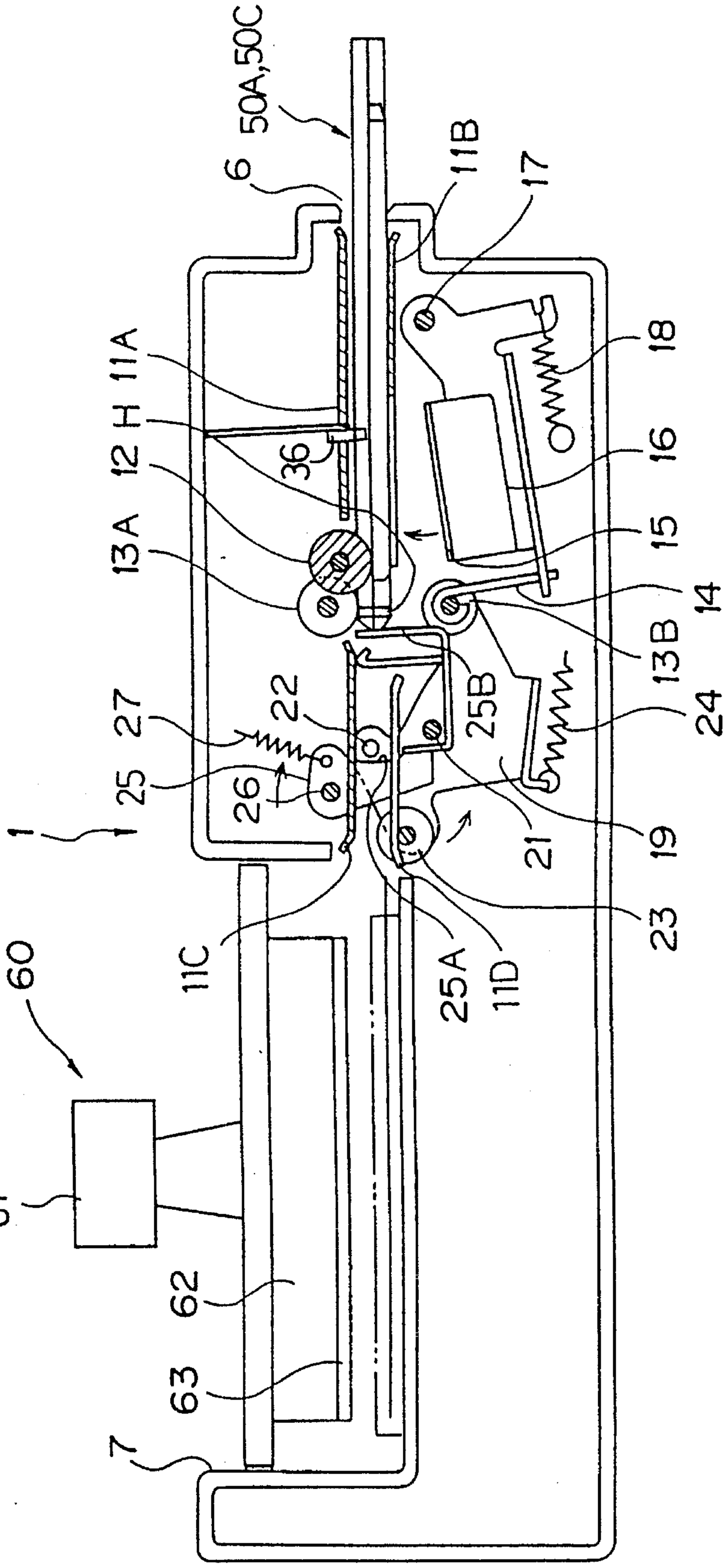

50A,50C
6
11B
17
18
OWC
16
15
14
13B
24
25B
22
27
25
26
1
13A
12
H
11A
36
21
19
23
25A
11D
11C
60
61
62
63
7

Fig.8

Fig.9 A

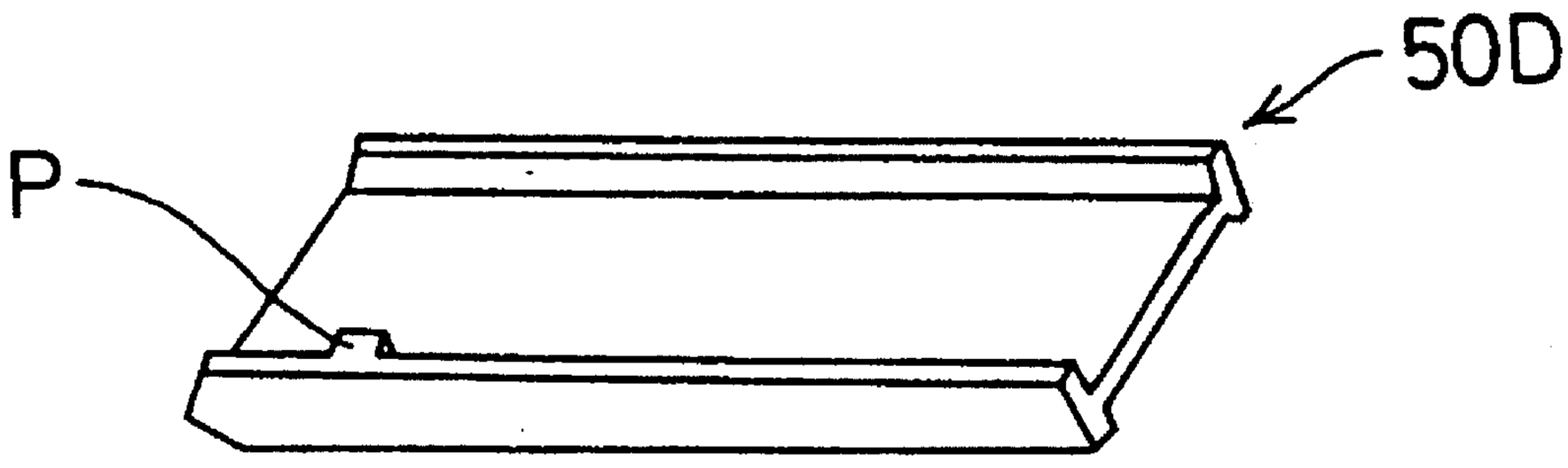


Fig.9 B

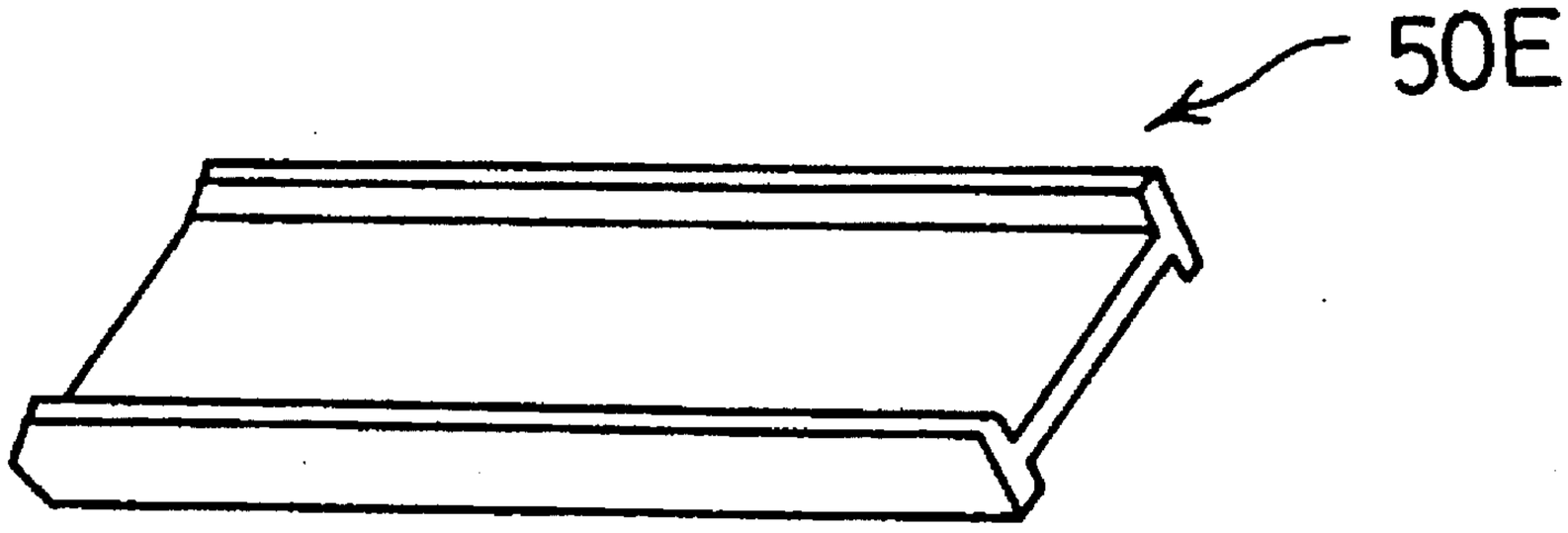


Fig.10A
PRIOR ART

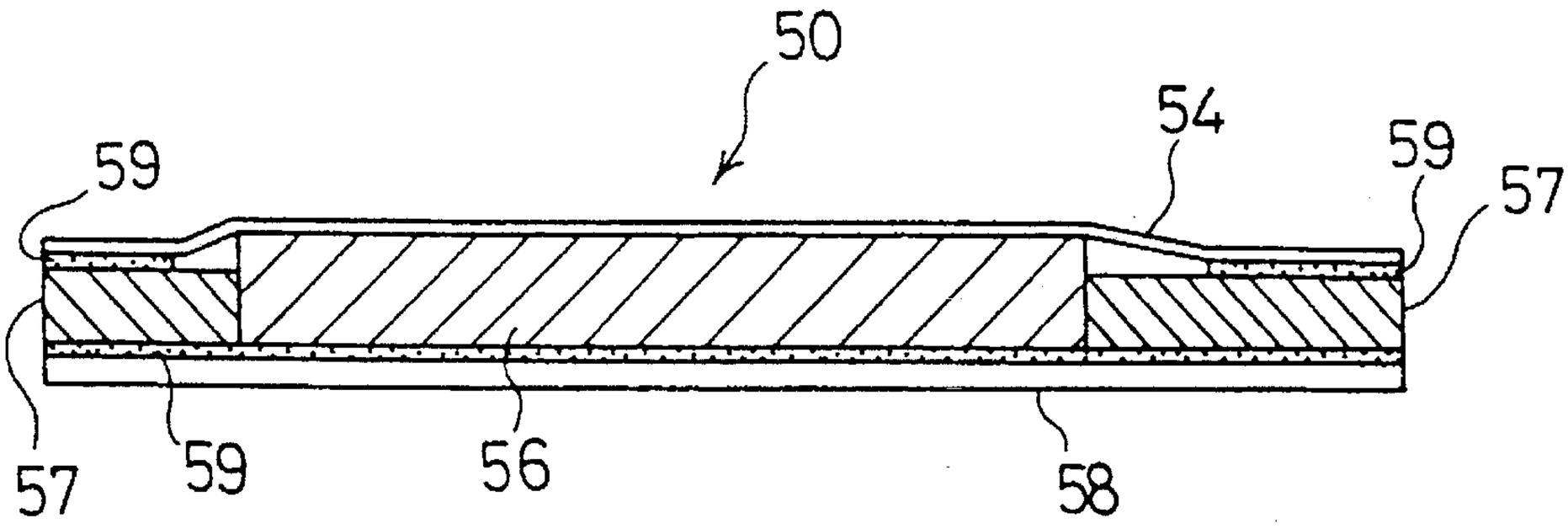


Fig.10B
PRIOR ART

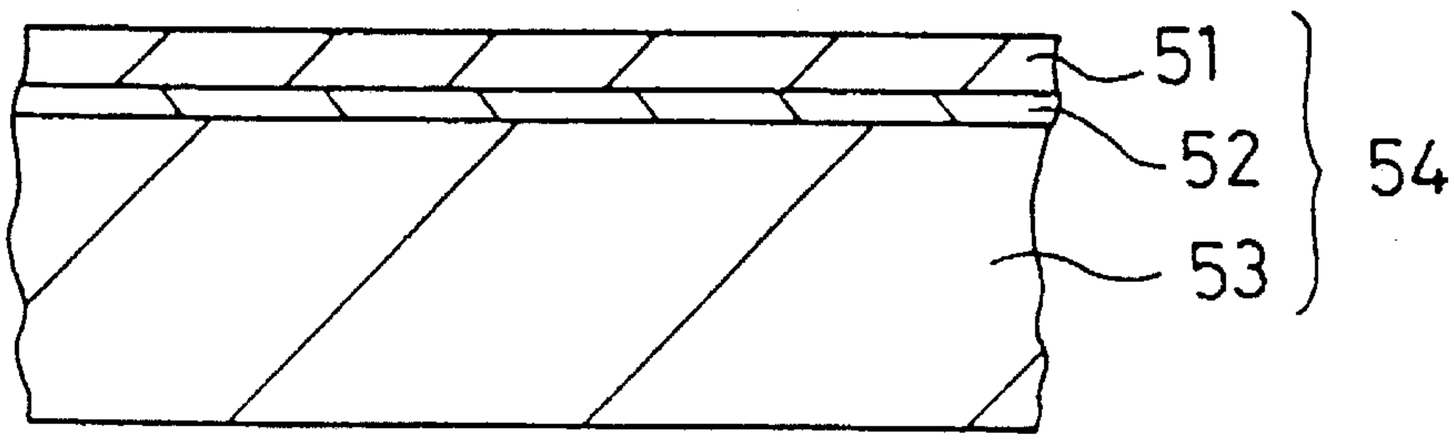


Fig.11
PRIOR ART

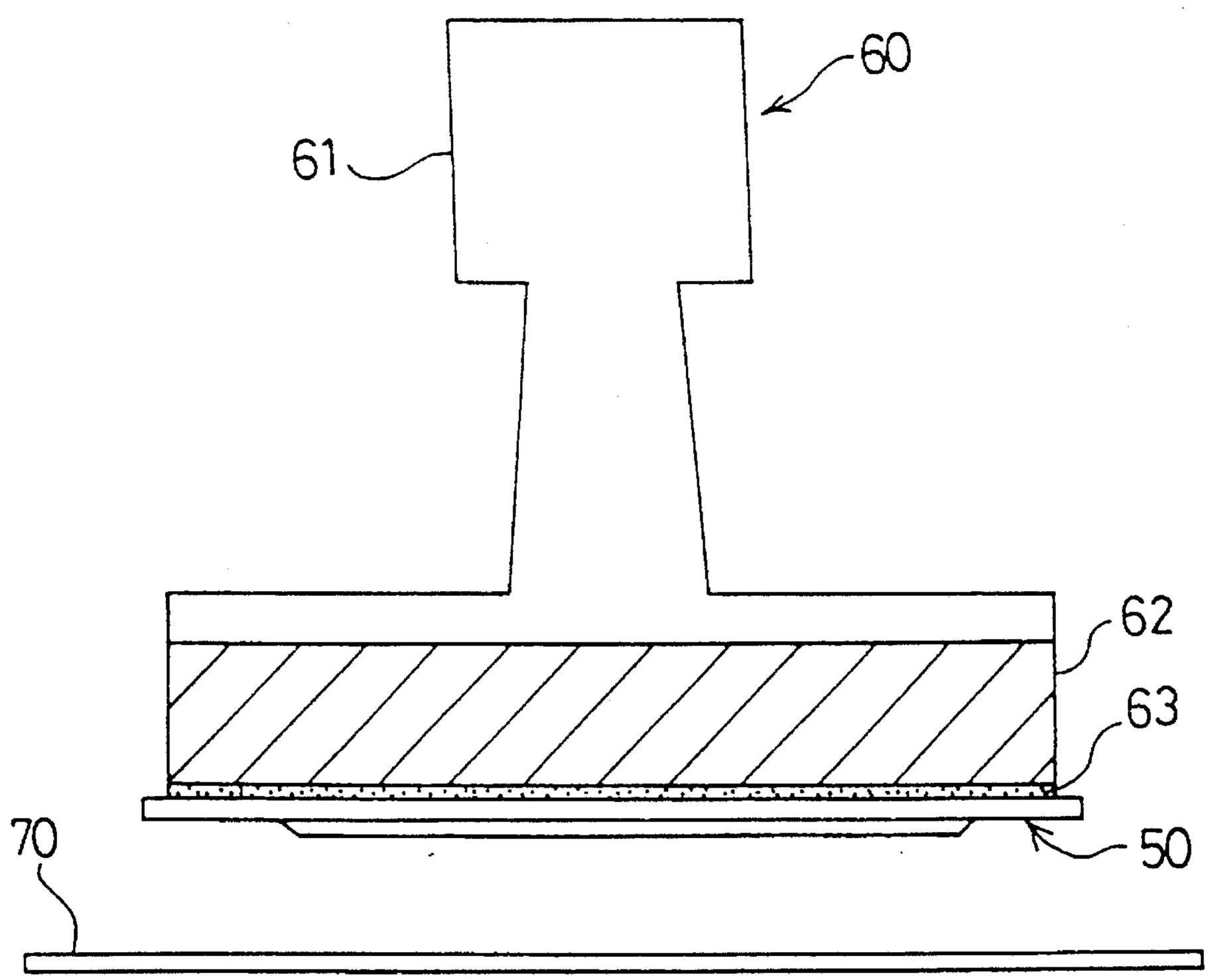


Fig.12

INK DRYNESS	HIGH	LOW
INK VISCOSITY	LOW	HIGH
INK BLURRING	LARGE	SMALL
INK-IMPREGNATED MEMBER	HARD	SOFT
EASINESS OF PERFORATION	EXCELLENT	BAD
SENSITIVITY OF STENCIL PAPER	BAD	EXCELLENT
PERFORATION ENERGY	SMALL	LARGE

METHOD AND APPARATUS FOR DETECTING A TYPE OF STENCIL AND CONTROLLING THERMAL PERFORATION ENERGY THEREBY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a plate making device and method, and particularly to a plate making device and method for forming a perforation image on a stencil plate with heat-perforating means.

2. Description of Related Art

A stencil plate as disclosed in Japanese Unexamined Patent Publication No. 61-72590 has been hitherto known as an ink-containing stencil plate used for a stamp device for stencil printing. The stencil plate as described above will be described with reference to FIGS. **10**A and **10**B.

As shown in FIGS. **10**A and **10**B, the stencil plate **50** comprises a heat sensitive stencil paper **54** formed of a thermoplastic film **51** and a porous supporting member **53**, non-woven cloth **56** serving as an ink-impregnated member, a frame **57** disposed so as to surround the non-woven cloth **56**, and a film **58** serving as an ink-impermeable base member, all of which are successively laminated. Adhesive agents **59** are provided between the heat sensitive stencil paper **54** and the frame **57**. Adhesive agents **52** are provided between the thermoplastic film **51** and the porous supporting member **53**.

A perforation image is formed on the thus-constructed stencil plate **50** by heat-melting the thermoplastic film **51** of the heat sensitive stencil paper **54** with a stamp device using a thermal head, for example (see reference numeral **1** in FIG. **2**) (formation of a perforation image is hereinafter referred to as "plate making"). The plate-made stencil plate **50** is installed into a stamp member **60** shown in FIG. **11**(see FIG. **2**), and stencil printing is performed by pushing the stamp member **60** against a print sheet **70**. The stamp member **60** includes a grip **61**, a cushion layer **62**, and an adhesive layer **63**.

Through experiment, it has been determined that the ink used for the stencil plate **50** as described above has characteristics as shown in FIG. **12**. That is, in order to enable the printed ink to dry rapidly, the viscosity of the ink should be reduced. However, in this case, the ink is liable to be blurred, and thus, print quality is lowered. When the ink viscosity is low, ink flow is improved for a harder ink-impregnated member, and thus, the print quality is improved.

When the ink-impregnated member is hard, there is good contact between the thermal head and the stencil paper in a plate-making process for the stencil paper, and thus, heat energy of the thermal head is easily transferred to the stencil paper so that a perforation image is easily formed. In this case, if the stencil paper has high sensitivity to perforation, perforated holes would be large. Therefore, the perforation sensitivity of the stencil paper must be lowered or energy to be applied to the thermal head must be reduced.

Further, in order to improve the print quality without concern of ink dryness, that is, using ink having low dryness, the ink viscosity must be increased, the ink-impregnated member must be soft, the stencil paper sensitivity must be improved and the energy to be applied to the thermal head must be increased.

As described above, various characteristic combinations may be proposed among the stencil paper, the ink and the ink-impregnated member that are used for the stencil printing. However, when the energy to be applied to the thermal head is constant, there occur problems in that in some cases, sufficient perforation cannot be performed in accordance with the type of the stencil plate, and the perforated holes can be excessively large.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a plate making device and method wherein even when various kinds of stencil plates are used, a plate making process providing high print quality for each stencil plate can be performed.

In order to attain the above object, the plate making device according to this invention includes heat-perforating structure for thermally perforating a heat sensitive stencil paper of a stencil plate according to a desired image, a detector for detecting a type of stencil plate and a controller for controlling perforation energy of the heat-perforating structure in accordance with an identification result of an identifying device. In the plate making device according to the invention thus constructed, the detector detects the type of stencil plate. On the basis of this detection, the controller controls perforation energy of the heat-perforating structure. Through this operation, the plate making process can be optimized irrespective of the type of stencil plate. Therefore, when any kind of stencil plate is inserted into the device, the optimum plate making process is performed, and the highest quality printing can be performed.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will be described in detail with reference to the following figures wherein:

FIG. **1**A shows an exploded perspective view of the stencil plate;

FIG. **1**B is a cross-sectional view of the stencil plate having a hole;

FIG. **1**C is a cross-sectional view of the stencil plate having no hole;

FIG. **2** is a perspective view of the plate making device and the stencil plate;

FIG. **3** is a cross-sectional view of the plate making device shown in FIG. **2** prior to operation;

FIG. **4** is a cross sectional view of the plate making device shown in FIG. **2** making a stencil plate during operation;

FIG. **5** is a partially perspective view of the plate making device;

FIG. **6** is a partially perspective view of the plate making device;

FIG. **7**A is a block diagram of a control system of the plate making device;

FIG. **7**B is a block diagram of a control system using a mechanical switch;

FIG. **8** is a cross-sectional view of the plate making device of another example;

FIG. **9**A is a perspective view of a stencil plate of another example;

FIG. **9**B is a perspective view of a stencil plate of another example;

FIG. **10**A is a cross-sectional view of a conventional stencil plate;

FIG. **10**B is a partially enlarged cross-sectional view of the conventional stencil plate;

FIG. **11** is a side view of a conventional stamp member; and

FIG. **12** is a table showing ink characteristics and print quality features.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Preferred embodiments according to this invention will be described with reference to the accompanying drawings.

FIGS. **1**A, **1**B and **1**C are an exploded perspective view and sectional views of stencil plates **50**A and **50**C. FIG. **2** is a perspective view of a plate making device **1**, and FIGS. **3**, **4** and **5** are a side sectional view and partial perspective views of the plate making device **1**. FIGS. **7**A and **7**B are block diagrams showing a control system for the plate making device.

First, the stencil plates **50**A and **50**C will be described.

As shown in FIGS. **1**A and **1**B, a hole **58**B is formed at the center of the left end portion of a film **58**A that is designed in a rectangular shape. A non-woven cloth **56**A impregnated with ink is disposed at the center position of the film **58**A. A rectangular hole **57**D is formed at the central portion of a frame **57**A so that the rectangular hole **57**D surrounds the non-woven cloth **56**A when the film **58**A and the frame **57**A are overlapped with each other. A hole **57**B is formed at the center of the left end portion of the frame **57**A. A hole **54**B is formed at the center of the left end portion of a heat sensitive stencil paper **54**A. The outline dimensions of the film **58**A and the heat sensitive stencil paper **54**A are equal to that of the frame **57**A.

The film **58**A, the non-woven cloth **56**A, the frame **57**A and the heat sensitive stencil paper **54**A are overlapped with one another at a prescribed position and are mutually adhesively attached to one another, thereby forming a stencil plate **50**A. At this time, the holes **58**B, **57**B and **54**B are aligned with one another, thereby forming a through hole H (see FIG. **1**B).

As shown in FIG. **1**C, a frame that has the same shape as the frame **57**A, but has no hole **57**B is provided as frame **57**C. Likewise, a film that has the same shape as the film **58**A, but has no hole **58**B is provided as film **58**C, and a heat sensitive stencil paper that has the same shape as the heat sensitive stencil paper **54**A, but has no hole **54**B is provided as heat sensitive stencil paper **54**C. At the center position of the film **58**C is disposed non-woven cloth **56**C impregnated with ink that is different from the ink impregnated in the non-woven cloth **56**A.

Like the stencil plate **50**A, the film **58**C, the non-woven cloth **56**C, the frame **57**C and the heat sensitive stencil paper **54**C are overlapped with one another at a prescribed position and are mutually adhesively attached to one another to form a stencil plate **50**C. The stencil plate **50**C has no through hole H. The type of stencil plate **50** is determined on the basis of the presence or absence of the through hole H.

In this embodiment, the ink that is impregnated in the non-woven cloth **56**A of the stencil plate **50**A is a high-dryness ink, which is rapidly dried. On the other hand, the ink that is impregnated in the non-woven cloth **56**C is a low-dryness ink, which is slowly dried, but with which printed characters are not easily blurred. Accordingly, as is apparent from the table of FIG. **12**, the stencil plate **50**A requires small perforation energy, and the stencil plate **50**C requires large perforation energy. The non-woven clothes **56**A and **56**C constitute the ink-impregnated member of this invention.

A polyethylene terephthalate film having a thickness of 2 μm (hereinafter referred to as "PET") is suitably used for the thermoplastic film **51** of the heat sensitive stencil paper **54**A and the heat sensitive stencil paper **54**C, or a film of polypropylene, vinylidene chloride-vinyl chloride copolymer or the like may be used. The thickness of PET is preferably set between about 1 μm and 4 μm. This is because PETs having a thickness of 1 μm or less have low strength, and it is impossible to perforate PETs having a thickness of 4 μm or more using a generally-used thermal head of about 50 mJ/mm^2.

The porous supporting member **53** (see FIG. **10**B) constituting part of the heat sensitive stencil paper **54** is suitably a natural fiber such as Manila hemp, paper mulberry (Broussonetia kazinoki), mitzumata (Edgeworthia papyrifera) or the like, a synthetic resin such as polyethylene terephthalate, polyvinyl alcohol, polyacrylonitrile or the like, or porous thin paper mainly containing semisynthetic fiber such as rayon.

Further, since the ink is impregnated in the non-woven clothes **56**A and **56**C, the material for the frames **57**A and **57**C surrounding the non-woven clothes **56**A and **56**C is suitably vinyl chloride, polypropylene, polyethylene, polyacetal or the like into which no ink is impregnated.

The films **58**A and the **58**C are ink-impermeable base members. An adhesive layer is coated on the upper surface (oblique-line portion in FIG. **1**) of each film, and both of the frame **57**A and the non-woven cloth **56**A (both of the frame **57**C and the non-woven cloth **56**C) are adhesively attached onto the adhesive layer. The material for the films **58**A and **58**C is suitably a resin film such as vinyl chloride, polypropylene, polyethylene terephthalate or the like, into which no ink is impregnated.

Next, the construction of the plate making device **1** will be described.

As shown in FIG. **2**, the plate making device **1** has an operation unit **1**A at the front side of the top face of the plate making device **1**. On the operation unit **1**A, a keyboard **2** is provided for inputting a desired perforation image, a display **3** formed of liquid crystal is provided for displaying the input perforation image, a plate-making switch **4** is provided for indicating the start of a plate making process, and an on/off switch **5** is provided for switching a power source on and off. At the right side surface of the plate making device **1** is provided an insertion window **6** through which the stencil plate **50**A or **50**C is inserted, and on the upper surface at the rear side of the plate making device **1** is provided a stamp groove **7** through which a stamp member **60** (see FIG. **11**) is inserted.

In the inner construction of the plate making device, as shown in FIG. **3**, first and second feeding guides **11**A and **11**B at upper and lower sides, respectively that guide the stencil plate **50**A or **50**C are disposed inside of the insertion window **6**. The stencil plate **50**A or **50**C is inserted into the insertion window **6** with the heat sensitive stencil papers **54**A and **54**C oriented facing downward. A platen **12** (see FIG. **6**), which cooperates with a thermal head **15** as described later, is disposed at the lower feeding side of the first feeding guide **11**A, and a pair of feeding rollers **13**A and **13**B for feeding the stencil plate **50**A or **50**C are provided in the vicinity and at the left side of the platen **12**.

Feeding roller **13**B is linked to a head holder **16** to which the thermal head **15** is secured through a link wire **14**. The

head holder **16** is rotated by a rotating device (not shown). The head holder **16** is rotatably secured to a shaft **17** that is fixed to the device at the upper portion of the right end of the head holder **16**, and it is urged in a clockwise direction by a spring **18** at the lower side of the right end.

Feeding roller **13B** is secured to the right-end portion of a roller holder **19**, which is rotatably supported by the shaft **21** (see FIG. **5**), and a pin **22** that is slidably contacted with the side end surface **25A** of a paper gate **25** is fixed to the upper tip portion of the roller holder **19**. A discharge roller **23** for discharging the stencil plate **50A** or **50C** to the stamp groove **7** is freely rotatably secured to the left end portion of the roller holder **19**.

The paper gate **25** is freely rotatably secured to the shaft **26**, and one end of a spring **27** is engaged with the right side of the paper gate **25** to urge the paper gate **25** in a counterclockwise direction.

With the above construction, upon rotation of the head holder **16** in the clockwise direction, the tip of the left end portion (heating portion) of the thermal head **15** is pressed against the heat sensitive stencil paper **54A** or **54C** by a predetermined pressing force. When the roller holder **19** is rotated counterclockwise around the shaft **21** against the force of a spring **24** in synchronism with the head holder **16** as described above, paper gate **25**, and the paper gate **25** is rotated clockwise around the shaft **26**. As a result, a gate portion **25B** of the paper gate **25** is moved downwardly, and the stencil plate **50A** or **50C** is allowed to be fed toward the left (a lower feeding side).

A light sensor **31** having a light irradiating unit **31A** and a light receiving unit **31B** (see FIGS. **3** and **7A**) is disposed above feeding roller **13A**, and light emitted from the light irradiating unit **31A** is irradiated to the through hole H of the stencil plate **50A**.

Third and fourth feeding guides **11C** and **11D** are disposed extending from the first and second feeding guides **11A** and **11B** and at the left side of the feeding rollers **13A** and **13B**.

In FIG. **3**, a stamp member **60** inserted in the stamp groove **7** is disposed at the left side of the third and fourth feeding guides **11C**, **11D**. The stamp member **60** comprises a grip **61**, a cushion layer **62** formed at the lower end of the grip **61** and an adhesive layer **63** formed on the lower surface of the cushion layer **62**. The stencil plate **50A** or **50C**, for which the plate making process is finished by the thermal head **15**, is guided and fed to the lower side of the stamp member **60** by the third and fourth feeding guides **11C** and **11D**.

Next, a control system for the plate making device **1** will be described with reference to FIG. **7A**.

As shown in FIG. **7A**, the light sensor **31** is connected to a controller **32** comprising a CPU, etc., and the controller **32** is connected to a ROM **33** for storing a program for performing the operation of the plate making device **1**, a RAM **34** for temporarily storing processed data, a thermal head **15**, which is contacted with the heat sensitive stencil paper **54** of the stencil plate **50** and serves to perforate the heat sensitive stencil paper **54**, and a driving motor **35** for driving the head holder **16** (see FIG. **3**).

The controller **32** is connected to the keyboard **2**, the plate making switch **4** and the liquid crystal display **3**. The controller **32** displays on the liquid crystal display **3** a perforation image formed of characters, images, ruled lines, etc. that are input through the keyboard **2**. By pushing down the plate making switch **4**, the thermal head **15** and the driving motor **35** are driven to perforate the heat sensitive stencil paper **54**, and a perforation image displayed on the liquid crystal display **3** is formed on the stencil plate **50A** or **50C**.

Next, an operation of inserting the stencil plate **50A**, **50C** into the plate making device **1** to form a desired perforation image will be described.

First, the on/off switch **5** is switched on to enable actuation of the plate making device **1**. Thereafter, the stencil plate **50C** is inserted into the insertion window **6** of the plate making device **1**, and the device is configured as shown in FIG. **3** so that the tip portion of the stencil plate **50C** abuts the gate portion **5B** of the paper gate **25**, and it is prevented from further advancing. At this time, as shown in FIG. **7A**, light is irradiated from the light irradiating unit **31A** of the light sensor **31** to the stencil plate **50C**, reflected from the frame **57C** and received by the light receiving unit **31B** of the light sensor **31**. A light reception signal is input from the light receiving unit **31B** to the controller **32**, and the controller **32** judges that the stencil plate **50C** has no through hole H.

When the stencil plate **50A** is inserted into the plate making device **1**, the light is irradiated from the light irradiating unit **31A** of the light sensor **31** to the through hole H of the stencil plate **50A**; however, the light is not reflected from the frame **57**, and thus, it does not reach the light receiving unit **31B** of the light sensor **31**. Therefore, the controller **32** determines that the printing plate is the stencil plate **50A**. The judgment result in either case is stored into RAM **34**.

When the stencil plate **50A** or **50C** is inserted, an operator inputs desired characters, images, ruled lines or the like through the keyboard **2** to form a perforation image. At this time, the input characters or the like are displayed on the display **3**. The operator checks the displayed characters, etc., and if a desired perforation image is displayed, the operator pushes down the plate-making switch **4**.

The plate-making process by the controller **32** is started in accordance with the pushing down of the plate-making switch **4**. First, the head holder **16** is rotated clockwise, whereby the thermal head **15** abuts against the lower surface of the stencil plate **50A** or **50C**. Through the clockwise rotation of the head holder **16**, the roller holder **19** is rotated counterclockwise, and the pin **22** is slidably contacted with the side end surface **25A** of the paper gate **25** to rotate the paper gate **25** clockwise around the shaft **26**. Through this operation, the paper gate **25** is rotated clockwise, and the stencil plate **50A** or **50C** is perforated to form the perforation image displayed on the display **3** while the stencil plate **50A** or **50C** is fed to the left by rotation of the feeding rollers **13A**, **13B**, as shown in FIG. **4**.

During the plate making process, if RAM **34** stores data indicating that the stencil plate **50C** (having no through hole H) is inserted in the plate making device **1**, the controller **32** supplies the thermal head **15** with a current for T2 seconds to control a heating time to be relatively long because the non-woven cloth **56C** in this stencil plate **50C** is impregnated with low-dryness ink and requires large perforation energy in the plate making process. As a result, the heat amount is increased, and the perforation energy is increased so that the heat sensitive stencil paper **54C** of the stencil plate **50C** can be suitably perforated.

On the other hand, if RAM **34** stores data indicating that the stencil plate **50A** (having the through hole H) is inserted in the plate making device **1**, the stencil plate **50A** is impregnated with high dryness ink, and thus small perforation energy is sufficient in the plate making process. Therefore, the controller **32** supplies the thermal head **15** with a

current for T1 seconds, which is shorter than T2 seconds, to control the heat time to be shorter. As a result, the heat amount of the thermal head **15** is reduced, and the perforation energy is reduced, so that the formed holes are prevented from being excessively large.

As described above, the controller **32** detects the type of stencil plate **50** inserted into the plate making device **1** using the light sensor **31**, and controls the heat time of the thermal head **15** to perform the optimum plate making process. Therefore, when any kind of stencil plate **50** is inserted, the optimum plate making process can be performed and excellent perforation can be achieved.

The perforated stencil plate **50**A or **50**C is fed through the discharge roller **23** to the stamp groove **7** as indicated by a two-dotted chain line in FIG. **3**. By pushing down the stamp member **60** in this state, the stencil plate **50**A or **50**C is adhesively bonded by the adhesive layer **63** of the stamp member **60**, and the operator removes the stamp member **60** from the stamp groove **7**. Through this operation, the print sheet **70** (see FIG. **11**) can be printed using the finished stamp member **60**.

This invention is not limited to the above embodiment, and various modifications may be made without departing from the scope of this invention.

In the embodiment as described above, two kinds of stencil plates **50** are identified on the basis of the presence or absence of the through hole H. It may be adopted that the number of kinds of through holes H is increased, and the number of the through holes H or the presence or absence of the through holes H is detected by plural light sensors to identify two or more kinds of stencil plates **50**.

Further, one of two kinds of current supply times to the thermal head **15** is selected in accordance with the identification result. However, there may be three or more kinds of current supply times set in accordance with the number of types of stencil plates **50**, and the optimum time is selected from these set times.

As a method of altering the perforation energy of the thermal head **15**, in the above embodiment, the heat time of the thermal head **15**, that is, the current supply time is altered. However, the perforation energy may also be altered by altering a voltage to be applied to the thermal head **15**.

Further, as a method of identifying the type of stencil plate **50**, in the above embodiment, the through hole H formed in the stencil plate **50** and the light sensor provided to the plate making device **1** are used. However, a notch may be formed in the stencil plate in place of the through hole H, which is detected by the light sensor **31**. Still further, in place of the light sensor **31**, a mechanical type switch **36** (FIGS. **7**B and **8**) may be provided so as to be switched on/off in accordance with the presence or absence of projection P as shown in FIG. **9**A to thereby identify the stencil plate **50**D. If the stencil plate **50**D is inserted in the insertion window **6**, the switch **36** is switched on by the projection P, and it is identified as the stencil plate **50**D. On the other hand, if a stencil plate **50**E without the projection P is inserted in the insertion window **6**, the switch **36** is off, and it is identified as the stencil plate **50**E.

What is claimed is:

1. A plate making device, comprising:

a stencil plate, the stencil plate being one of at least two types, each type having a unique identifying feature and comprising an ink impermeable layer, a frame, a non-woven cloth impregnated with ink, and a heat sensitive stencil paper;

heat-perforating means for thermally perforating the heat sensitive stencil paper of the stencil plate according to a desired image;

detecting means for detecting the type of the stencil plate based on the unique identifying feature; and

controlling means for controlling perforation energy of said heat-perforating means in accordance with the detected type of the stencil plate.

2. The plate making device according to claim **1**, wherein said detecting means discriminates which of the at least two types of stencil plate is present in accordance with the unique identifying feature comprising at least one of an existence and number of apertures in the stencil plate.

3. The plate making device according to claim **1**, wherein the frame surrounds the non-woven cloth, and the ink impermeable layer and the heat sensitive stencil paper sandwich the non-woven cloth and the frame therebetween.

4. The plate making device according to claim **3**, wherein the heat sensitive stencil paper is formed of a film of material selected from the group consisting of polyethylene terephthalate, polypropylene, and vinylidene chloride-vinyl chloride copolymer having a thickness of about 1–4 μm.

5. The plate making device according to claim **1**, further comprising:

a first shaft fixed to the plate making device;

a second shaft;

a third shaft;

a heat-perforating means holder supporting said heat-perforating means, said heat-perforating means holder being rotatable about said first shaft;

a spring fixed to said heat-perforating means holder and urging said heat-perforating means holder toward a heat-perforating means engagement position;

a feeding roller movable with rotation of said heat-perforating means holder, said feeding roller fixed to a roller holder, said roller holder being rotatable about said second shaft and comprising a pin; and

a paper gate rotatably supported by said third shaft, said pin engaging said paper gate, said heat-perforating means holder engaging said roller holder such that rotation of said heat-perforating means holder causes said roller holder to rotate in synchronism with said heat-perforating means holder, and wherein said pin urges said paper gate to clear a feeding path for the stencil plate.

6. The plate making device according to claim **1**, wherein said detecting means comprises a light sensor having a light irradiating unit and a light receiving unit.

7. The plate making device according to claim **6**, wherein said controlling means comprises a CPU operatively coupled with said light sensor, said CPU controlling the perforation energy in accordance with a signal from the light sensor.

8. A plate making device according to claim **1**, wherein said detecting means comprises a switch movable between at least a first position and a second position in accordance with the presence of the unique identifying feature comprising a projection on said stencil plate.

9. The plate making device according to claim **1**, wherein the type of the stencil plate is differentiated by a kind of the ink impregnating the non-woven cloth.

10. The plate making device according to claim **9**, wherein the at least two types of stencil plate comprise a low-dryness ink stencil plate and a high-dryness ink stencil plate, and wherein when said detecting means detects the low-dryness ink stencil plate, said controlling means supplies current to said heat-perforating means for a first predetermined time, and when said detecting means detects the high-dryness ink stencil plate, said controlling means

supplies current to said heat-perforating means for a second predetermined time shorter than the first predetermined time.

11. The plate making device according to claim **9**, wherein the at least two types of stencil plate comprise a low-viscosity ink stencil plate and high-viscosity ink stencil plate, and when the detecting means detects the low-viscosity ink stencil plate, the controlling means supplies current to the heat-perforating means for a first predetermined time, and when the detecting means detects the high-viscosity ink stencil plate, the controlling means supplies current to the heat-perforating means for a second predetermined time longer than the first predetermined time.

12. A plate making device, comprising:

a stencil plate, the stencil plate being one of at least two types, each type having a unique identifying feature and comprising an ink impermeable layer, a frame, a non-woven cloth impregnated with ink, and a heat sensitive stencil paper;

a thermal head that perforates the heat sensitive stencil paper of the stencil plate according to a desired image;

a detector that detects the type of the stencil plate; and

a controller operatively coupled to said detector and said thermal head, said controller controlling operation and perforation energy of said thermal head in accordance with a signal from said detector.

13. The plate making device according to claim **12**, wherein the frame surrounds the non-woven cloth, and the ink impermeable layer and the heat sensitive stencil paper sandwich the non-woven cloth and the frame therebetween.

14. The plate making device according to claim **13**, wherein the heat sensitive stencil paper is formed of a film of material selected from the group consisting of polyethylene terephthalate, polypropylene, and vinylidene chloride-vinyl chloride copolymer having a thickness of about 1–4 μm.

15. The plate making device according to claim **12**, further comprising:

a first shaft fixed to the plate making device;

a second shaft;

a third shaft;

a head holder supporting said thermal head, said head holder being rotatable about said first shaft;

a spring fixed to said head holder and urging said head holder toward a thermal head engagement position;

a feeding roller movable with rotation of said head holder, said feeding roller fixed to a roller holder, said roller holder being rotatable about said second shaft and comprising a pin; and

a paper gate rotatably supported by said third shaft, said pin engaging said paper gate, said head holder engaging said roller holder such that rotation of said head holder causes said roller holder to rotate in synchronism with said head holder, and wherein said pin urges said paper gate to clear a feeding path for the stencil plate.

16. The plate making device according to claim **12**, wherein said detector comprises a light sensor having a light irradiating unit and a light receiving unit.

17. The plate making device according to claim **16**, wherein said controller comprises a CPU operatively coupled with said light sensor, said CPU controlling said perforation energy in accordance with the signal from said light sensor.

18. The plate making device according to claim **10**, wherein said detector discriminates between the at least two types of stencil plate in accordance with the unique identifying feature comprising at least one of an existence and number of apertures in the stencil plate.

19. A plate making device according to claim **12**, wherein said detector comprises a switch movable between at least a first position and a second position in accordance with the presence of the unique identifying feature comprising a projection on said stencil plate.

20. The plate making device according to claim **12**, wherein the type of the stencil plate is differentiated by a kind of the ink impregnating the non-woven cloth.

21. The plate making device according to claim **20**, wherein the at least two types of stencil plate comprise a low-dryness ink stencil plate and a high-dryness ink stencil plate, and wherein when said detector detects the low-dryness ink stencil plate, said controller supplies current to said thermal head for a first predetermined time, and when said detector detects the high-dryness ink stencil plate, said controller supplies current to said thermal head for a second predetermined time shorter than said first predetermined time.

22. The plate making device according to claim **29**, wherein the at least two types of stencil plate comprise a low-viscosity ink stencil plate and high-viscosity ink stencil plate, and when the detector detects the low-viscosity ink stencil plate, the controller supplies current to the heat-perforating means for a first predetermined time, and when if the detector detects the high-viscosity ink stencil plate, the controller supplies current to the heat-perforating means for a second predetermined time longer than the first predetermined time.

23. A method of forming a stencil plate having a heat sensitive stencil paper for a stamp device, the method comprising:

thermally perforating the heat sensitive stencil paper of the stencil plate according to a desired image;

detecting a type of the stencil plate; and

controlling perforation energy in said thermal perforating step in accordance with the type of the stencil plate.

24. The method according to claim **23**, wherein the type of the stencil plate comprises at least two types of stencil plate, said detecting step comprising discriminating which one of the at least two types of stencil plate is present in accordance with at least one of an existence and number of apertures in the stencil plate.

25. The method according to claim **23**, wherein said detecting step comprises detecting light with a light sensor having a light irradiating unit and a light receiving unit.

26. The method according to claim **25**, wherein said controlling step comprises controlling the perforation energy in accordance with a signal from said light sensor.

27. The method according to claim **23**, wherein the type of the stencil plate comprises at least two types of stencil plate comprising a low-dryness ink stencil plate and a high-dryness ink stencil plate, and wherein when said detecting step detects the low-dryness ink stencil plate, said controlling step comprises supplying current in said thermal perforating step for a first predetermined time, and when said detecting step detects the high-dryness ink stencil plate, said controlling step comprises supplying current in said heat-perforating step for a second predetermined time shorter than the first predetermined time.

28. The method according to claim **23**, wherein the type of the stencil plate is one of at least two types of the stencil plate, the at least two types of stencil plate comprise a low-viscosity ink stencil plate and high-viscosity ink stencil plate, and when the detecting step detects the low-viscosity

ink stencil plate, the controlled perforation energy is supplied for a first predetermined time, and when the detecting step detects the high-viscosity ink stencil plate, the controlled perforation energy is supplied for a second predetermined time longer than the first predetermined time.

29. A plate making device, comprising:

a stencil plate, the stencil plate being one of at least two types, each type having a unique identifying feature and comprising an ink impermeable layer, a frame, a non-woven cloth impregnated with ink and a heat sensitive stencil paper;

heat-perforating means for thermally perforating the heat sensitive stencil paper of the stencil plate according to a desired image;

signal providing means for providing a signal representing the type of the stencil plate; and

controlling means for controlling perforation energy of said heat-perforating means in accordance with the type of the stencil plate.

30. The plate making device according to claim **29**, wherein the at least two types of stencil plate comprise a low-dryness ink stencil plate and a high-dryness ink stencil plate, wherein when said signal providing means provides a signal representing the low-dryness ink stencil plate, said controlling means supplies current to said heat-perforating means for a first predetermined time, and when said signal providing means provides a signal representing the high-dryness ink stencil plate, said controlling means supplies current to said heat-perforating means for a second predetermined time shorter than the first predetermined time.

31. The plate making device according to claim **29**, wherein the non-woven cloth impregnated with ink is disposed at a central portion of the frame and supported between the ink impermeable layer and the heat sensitive stencil paper.

32. The plate making device according to claim **31**, wherein the type of the stencil plate is differentiated by a kind of the ink impregnating the non-woven cloth.

33. The plate making device according to claim **29**, wherein the at least two types of stencil plate comprise a low-viscosity ink stencil plate and high-viscosity ink stencil plate, and said signal providing means further comprises detecting means for detecting the type of the stencil plate, when the detecting means detects the low-viscosity ink stencil plate, the controlling means supplies current to the heat-perforating means for a first predetermined time, and when the detecting means detects the high-viscosity ink stencil plate, the controlling means supplies current to the heat-perforating means for a second predetermined time longer than the first predetermined time.

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